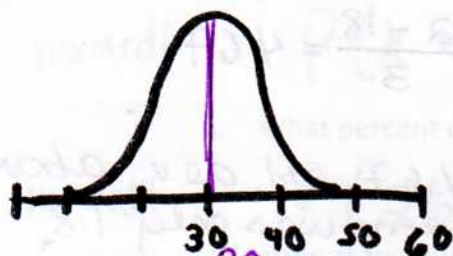


NAME: Key

Ch. 5 Review

1) Looking at the following curves, approximate the mean, median, and mode on the graph.

Curve 1

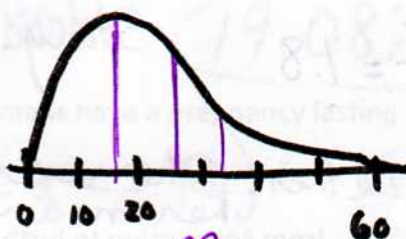


Mean = 30

Median = 30

Mode = 30

Curve 2

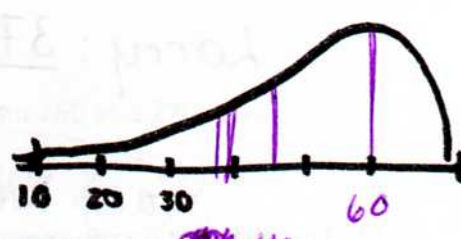


Mean = 32

Median = 25

Mode = 18

Curve 3



Mean = 40

Median = 45

Mode = 60

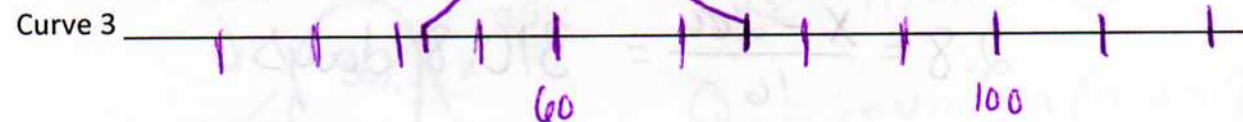
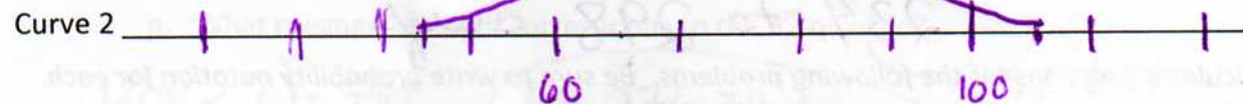
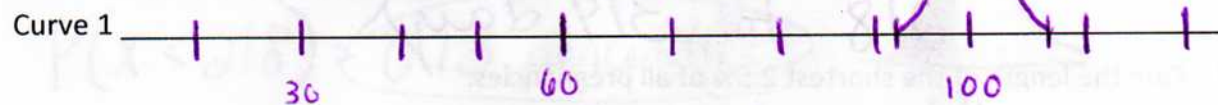
2) All normal curves have the same shape (symmetric)

3) Sketch the following normal curves on the number lines below:

Curve 1: $\bar{x} = 100$, $s = 2$

Curve 2: $\bar{x} = 75$, $s = 10$

Curve 3: $\bar{x} = 60$, $s = 5$



- 4) Male and female professional basketball players have very different average scoring statistics. Per game, men average 28 points with a standard deviation of 5 points. Per game, women average 18 points with a standard deviation of 3 points. Larry and Stacy are both basketball players. In their last games, Larry scored 37 points and Stacy scored 32. Who was actually the better scorer? Justify your answer.

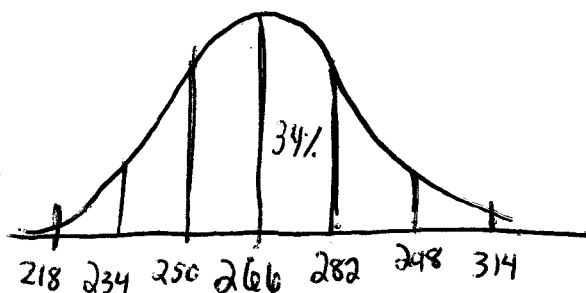
$$\text{Larry: } \frac{37-28}{5} = 1.8$$

$$\text{Stacy: } \frac{32-18}{3} = 4.67$$

Stacy was better. She was 4.67 std. dev. above her mean. Larry was only 1.8.

- 5) The distribution of pregnancy lengths from conception to birth for humans is normally distributed with a mean of 266 days and a standard deviation of 16 days.

- a. Sketch a picture of the distribution below. Label all standard deviations.



Use the empirical rule (the 68-95-99.7 rule) for the problems below (you may want to draw pictures)

- b. Find the length of the longest 16% of all pregnancies.

longer than 282 days

- c. Find the length of the middle 99.7% of all pregnancies.

218 to 314 days

- d. Find the length of the shortest 2.5% of all pregnancies.

below 234 days

- e. Find the length of the middle 95% of all pregnancies.

234 to 298 days

Use the calculator functions for the following problems. Be sure to write probability notation for each.

- f. What z-score does a pregnancy of 257 days have?

$$z = \frac{X - \bar{x}}{s} = \frac{257 - 266}{16} = -0.5625$$

- g. A z-score of 2.8 corresponds to what pregnancy length?

$$2.8 = \frac{X - 266}{16} = 310.8 \text{ days}$$

h. What percent of humans have a pregnancy lasting less than 257 days?

normcdf

$$P(X < 257) = 28.89\%$$

i. What percent of humans have a pregnancy lasting longer than 280 days?

normcdf

$$P(X > 280) = 19.08\%$$

j. What percent of humans have a pregnancy lasting between 260 and 270 days?

normcdf

$$P(260 < X < 270) = 24.49\%$$

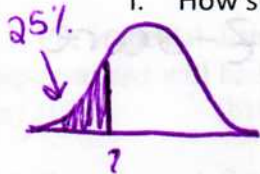
k. How long would a pregnancy have to last to be in the longest 10% of all pregnancies?



$$P(X > ?) = 10\%$$

$$? = \text{invnorm}(0.9, 266, 16) = 286.51 \text{ days}$$

l. How short would a pregnancy be to be in the shortest 25% of all pregnancies?

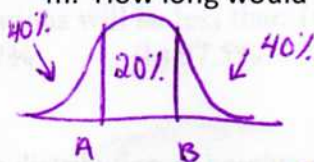


$$P(X < ?) = 25\%$$

$$? = \text{invnorm}(0.25, 266, 16)$$

$$= 255.21 \text{ days}$$

m. How long would a pregnancy be to be in the middle 20% of all pregnancies?

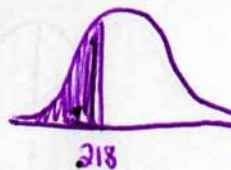


$$A = \text{invnorm}(0.40, 266, 16) = 261.95 \text{ days}$$

$$B = \text{invnorm}(0.60, 266, 16) = 270.05 \text{ days}$$

n. What percentile is a pregnancy of 218 days?

$$P(X < 218) = 0.13 \text{ percentile}$$



o. What percentile is a pregnancy of 298 days?

$$P(X < 298) = 97.72 \text{ percentile}$$

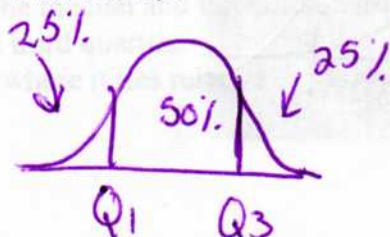
p. What pregnancy length corresponds to the 3rd quartile?

$$P(X < ?) = 75\%$$

$$? = 276.79 \text{ days}$$

75% below

q. Find the IQR.



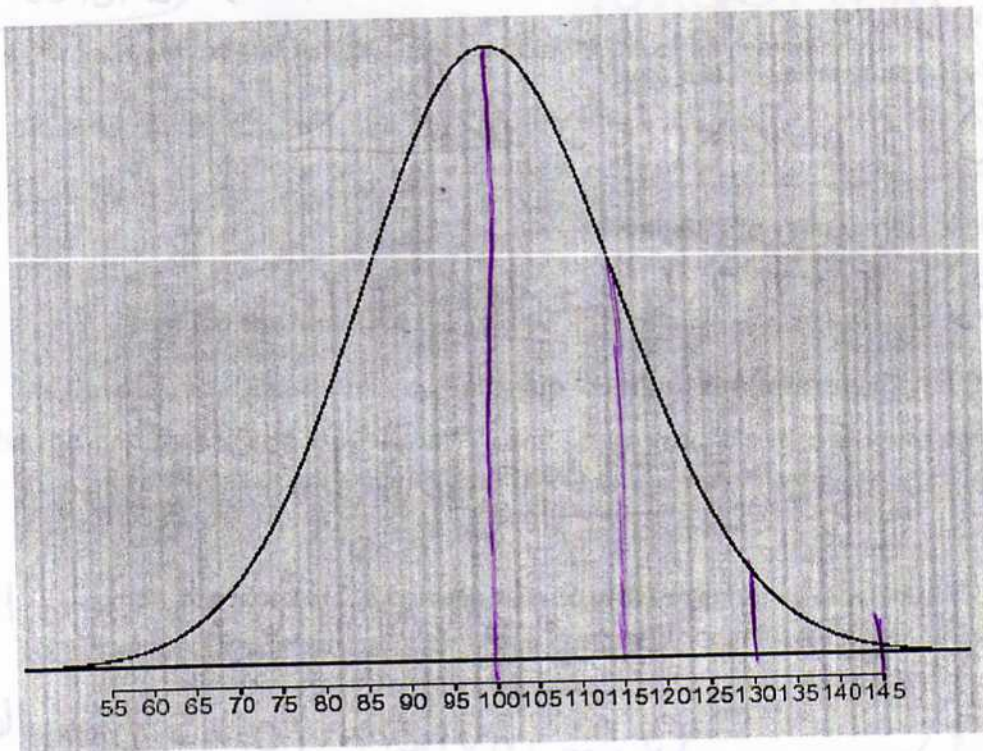
$$Q_3 = \text{invnorm}(0.75, 266, 16)$$

$$Q_1 = \text{invnorm}(0.25, 266, 16) = 255.21 \text{ days}$$

MULTIPLE CHOICE:

Suppose that the BAC of male students at a particular college who drink 5 beers varies from student to student according to a normal distribution with mean 0.08 and standard deviation 0.01. **The next three questions use this information.**

- 1. The middle 95% of students who drink 5 beers have BAC between
(a) 0.07 and 0.09 (b) 0.06 and 0.10 (c) 0.05 and 0.11 (d) 0.04 and 0.12
- 2. What percent of students who drink 5 beers have BAC above 0.08 (the legal limit for driving in most states)?
(a) 2.5% (b) 5% (c) 16% (d) 32% (e) 50%
- 3. What percent of students who drink 5 beers have BAC above 0.10 (the legal limit for driving other states)?
(a) 2.5% (b) 5% (c) 16% (d) 32% (e) 50%
- 4. SAT scores are normally distributed with mean 500 and standard deviation 100. Julie scores 650. Her standard score is
(a) 150 (b) 15 (c) 1.5 (d) 0.15 *z-score*
- 11. The mean of any *normal* density curve is
(a) the point where the curvature of the curve changes.
(b) the point at which the curve reaches its highest value.
(c) the point at which the curve would balance if made of solid material.
(d) the point with half the area under the curve to its left and to its right.



(other page)

13. The mean of the normal curve above is

- (a) 80 (b) 90 (c) 100 (d) 110 (e) 120

14. The standard deviation of the normal curve above is

- (a) 5 (b) 10 (c) 15 (d) 20 (e) 25

15. If you know the mean and standard deviation of a distribution, do you know the complete shape of the distribution?

- (a) Yes, always.
(b) Yes if the distribution is normal, but not in general.
(c) Yes if the distribution is symmetric, but not in general.
(d) No, never.

16. For a normal distribution with mean 20 and standard deviation 5, approximately what percent of the observations will be between 5 and 35?

- (a) 50% (b) 68% (c) 95% (d) 99.7% (e) 100%

17. For a normal distribution with mean 20 and standard deviation 5, approximately what percent of the observations will be less than 20?

- (a) 50% (b) 68% (c) 95% (d) 99.7% (e) 100%

18. For a normal distribution with mean 20 and standard deviation 5, approximately what percent of the observations will be less than 10?

- (a) 99.7% (b) 97.5% (c) 2.5% (d) 95% (e) 99%

28. The distribution of heights of adult men is approximately normal. A man is at the 61.79th percentile. What percent of all men are taller than he is?

- (a) 61.79% (b) 38.21% (c) 0.3%
(d) We can't tell from the given information.
(e) We can't tell without the normal table from the text.

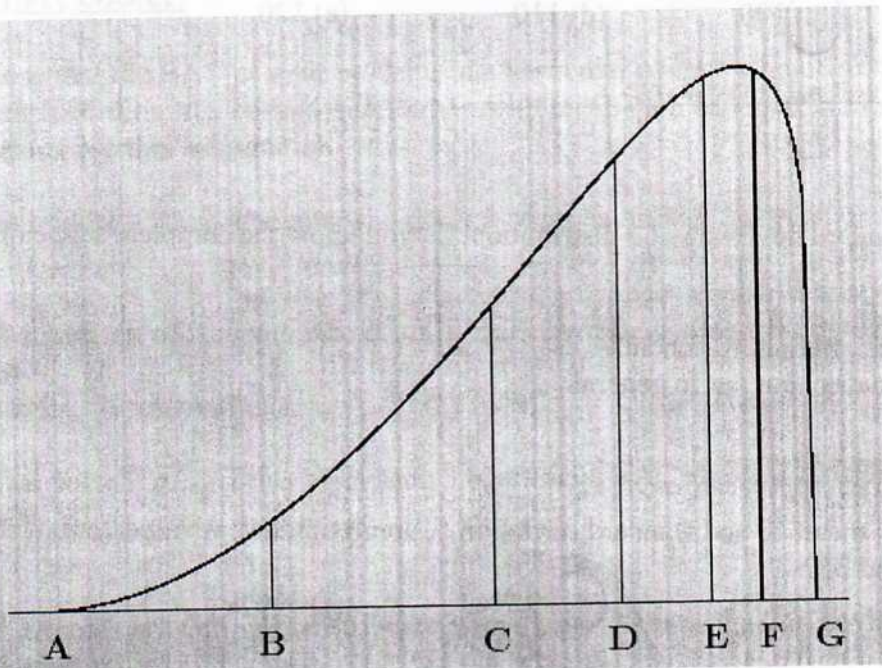
29. Which of the following is **least** likely to have a nearly normal distribution?

- (a) Heights of all female students taking STAT 001 at State Tech.
(b) IQ scores of all students taking STAT 001 at State Tech.
(c) The SAT Math scores of all students taking STAT 001 at State Tech.
(d) Family incomes of all students taking STAT 001 at State Tech.
(e) Time from conception to birth of all students taking STAT 001 at State Tech.



39. If your score on a test is at the 60th percentile, you know that your score lies

- (a) below the first quartile.
(b) between the first quartile and the median.
(c) between the median and the third quartile.
(d) above the third quartile.
(e) Can't say where it lies relative to the quartiles.



45. The figure above is the density curve of a distribution. This distribution is

- (a) Roughly symmetric.
- ☒ (b) Skewed to the left.
- (c) Skewed to the right.
- (d) Positively correlated.
- (e) Negatively correlated.

46. Five of the seven points marked on this density curve make up the five-number summary for this distribution. Which two points are *not* part of the five-number summary?

- (a) B and E
- (b) C and F
- (c) C and E
- ☒ (d) B and F
- (e) A and G